

IN THE DRAWINGS

The attached sheets of drawings include changes to Figs. 2 and 3. These sheets, which include Figs. 2 and 3, replace the original sheets including Figs. 2 and 3.

Attachment: Replacement Sheet (2)

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-22 are pending in the present application. Claim 17 is amended by the present amendment to adapt the Examiner's suggestions. Claim 17 has been amended to include the words International Annealed Copper Standard that form the basis for the acronym IACS of Claim 17. See the specification at page 5, lines 27-28. No new matter is added.

In the outstanding Office Action, the drawings were objected to; the specification was objected to; Claims 20-22 were objected to because of informalities; Claims 17-19 were rejected under 35 U.S.C. § 112, second paragraph; and Claims 1-22 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,981,085 to Ninomiya et al. (herein "Ninomiya").

In response to the objection to the drawings, Figures 2 and 3 have been designated background art. Accordingly, Applicants respectfully request that the objection to the drawings be withdrawn.

Applicants respectfully traverse the objection to the specification and Claims 20-22. Applicants submit that the use of "mm" in the specification and claims is appropriate. Grain coarsening or oversize of a crystal particle diameter may be seen because the crystal growth was not interrupted, but rather promoted owing to the elimination of impurity. Accordingly, Applicants respectfully request that the objections to the specification and Claims 20-22 be withdrawn.

In response to the second paragraph of 35 U.S.C. § 112 rejection of Claims 17-19, Applicants note that IACS is not a trademark but is a standard for measuring conductivity that is known as the International Annealed Copper Standard. See the specification at pages 5,

lines 27-28. Accordingly, Applicants respectfully request that this rejection of Claims 17-19 be withdrawn.

Applicants respectfully traverse the rejection of Claim 1 as anticipated by Ninomiya.

Claim 1 recites a heat-conducting multi-layer substrate including, *inter alia*, at least a Cu circuitry layer *of at least 99.999% purity*. This claimed features prevents the accumulation of internal stress even when used under conditions of being repeatedly subjected to heat cycle of -40 to 125°C and work hardening at high temperature during heat cycle can be inhibited.<sup>1</sup> In addition, Table 2 on page 10 and Table 3 on page 14 depict additional advantages, such as a reduced defect rate.

Ninomiya describes a composite substrate with heat dissipating properties. As shown in Figure 3, a substrate 8 having the heat-generating semiconductor device mounted therein, is bonded with solder 6 onto the composite layer 2. Ninomiya describes an insulated layer on the composite substrate that a circuit pattern can be formed on a surface thereof, but Ninomiya does not disclose or suggest a layer of copper with at least 99.999% purity. In this regard, 99.99% and 99.999% are different, not the same. The differences between these two purities should be clear from a comparison of Cu purity 4N (99.99%) and 5N (99.999%) in table 2, for example.

In addition, page 4, lines 9-12 of the outstanding action simply assumes that because the term “copper” could apply to 5N copper with 99.999% purity, the mere use of the term copper by Ninomiya actually teaches using copper of 99.999% purity. Applicants disagree because the simple term “copper” includes no indication of the purity thereof and the only specific teaching in Ninomiya is a purity of 99.99% which does not have the unexpected advantages of 5N and 6N copper noted in the specification (99.999% and 99.9999% purity). The term copper is clearly ambiguous as to any particular purity level when considered alone

---

<sup>1</sup> Specification at page 8, lines 10-16.

and basing an anticipation rejection on such an ambiguous term has long been held to be improper. See In re Tunlay, 304 F.2d 893, 899, 134 USPQ 355,360 (CCPA 1962).

Therefore, Ninomiya does not disclose or suggest a heat-conducting multi-layer substrate including a Cu circuitry layer of at least 99.999% purity, as recited in Claim 1.

Although different in scope, Claims 2 and 4 recite "a Cu circuitry layer having at least 99.999% purity" and "the circuitry layer and the metal layer are composed of a copper of at least 99.999% purity," respectively. As discussed above, Ninomiya does not disclose or suggest these features. Accordingly, Applicants respectfully request that the rejection of Claims 1, 2 and 4 and each of the claims depending therefrom be withdrawn.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Gregory J. Maier  
Attorney of Record  
Registration No. 25,599

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 06/04)

Raymond F. Cardillo, Jr.  
Registration No. 40,440